The University Of Toledo

New Graduate Course Proposal

* denotes required fields

1. College*: College Business and Innovation

   Department*: Info Operations and Tech Management

2. Contact Person*: Yue Zhang Phone: 530-2380 (xxx - xxxx) Email: yue.zhang@utoledo.edu

3. Alpha/Numeric Code (Subject area - number)*: MFGM - 8650

4. Proposed title*: Stochastic Modeling

   Proposed effective term*: 201740 (e.g. 201140 for 2011 Fall)

5. Is the course cross-listed with another academic unit? ○ Yes ◉ No

   Approval of other academic unit (signature and title)

   Is the course offered at more than one level? ○ Yes ◉ No

   If yes, an undergraduate course proposal form must also be submitted. If the undergraduate course is new, complete the New Undergraduate Course Proposal; if the undergraduate course is existing, submit an Undergraduate Course Modification Proposal.

6. Credit hours*: Fixed: 3 or Variable: to

7. Delivery Mode:

	Primary*	Secondary	Tertiary
a. Activity Type *	Seminar	--SelectType--	--SelectType--
b. Minimum Credit Hours *	3		
Maximum Credit Hours *	3		
c. Weekly Contact Hours *	3		

8. Terms offered: ☑ Fall ☑ Spring ☐ Summer

   Years offered: ◉ **Every** ○ **Alternate**

Year **Years**

9. Are students permitted to register for more than one section during a term? ◉ No ○ Yes

   May the courses be repeated for credit? ◉ No ○ Yes Maximum Hours

10. Grading System*:
    - ◉ Normal Grading (A-F, S/U, WP/WF, PR, I)
    - ○ Satisfactory/Unsatisfactory (A-C, less than C)
    - ○ Grade Only (A-F, WP/WF, PR, I)
    - ○ Audit Only
    - ○ No Grade

11. Prerequisites (must be taken **before**): i.e. C or higher in (BIOE 4500 or BIOE 5500) and C or higher in MATH 4200

    ○ PIN (Permisson From Instructor) ○ PDP (Permission From Department)

    Co-requisites (must be taken **together**):

12. Catalog Description* (**75 words Maximum**)

    This course covers basic principles and methods in applied probability and stochastic modeling. The topics covered in this course include advanced probably theory, stochastic processes, Markov chains, Markov Decision Processes, queuing theory, computer simulation, etc. Applications of these techniques in supply chain management, manufacturing, transportation, and finance are introduced.

13. Attach a syllabus - a syllabus template is available from the University Teaching Center. Click here for the Center's template.

File Type	View File
Syllabus	View

14. Comments/Notes:

This course will focus on advanced probability theory, stochastic processes, and Markov chains. This set of modeling techniques finds application in decision-making in diverse areas such as supply chain management, manufacturing, transportation, and finance.

15. Rationale:

We have simultaneously submitted a proposal to revise the PhD program in Manufacturing and Technology Management. In this proposal, we attempt to strengthen the Information Systems (IS) and Operations and Supply Chain Management (OSCM) tracks in this PhD Program. We have significantly increased the emphasis on the core research methods by introducing new courses and seminars.

Course Approval:

Department Curriculum Authority:	Bassam Hasan	Date	2017/04/03
Department Chairperson:	P. S. Sundararaghavan	Date	2017/04/03
College Curriculum Authority or Chair:	Michael Mallin	Date	2017/04/03
College Dean:	Anand S. Kunnathur	Date	2017/04/03
Graduate Council:	Constance Schall, GC mtg 4/18/17	Date	2017/04/19
Dean of Graduate Studies:	Amanda C. Bryant-Friedrich	Date	2017/05/01
Office of the Provost :		Date	

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Administrative Use Only

Effective Date: (YYYY/MM/DD)

CIP Code:

Subsidy Taxonomy:

Program Code:

Instructional Level:

Registrar's Office Use Only

Processed in Banner on:

Processed in Banner by:

Banner Subject Code:

Banner Course Number:

Banner Term Code:

Banner Course Title:

MFGM 8650: Stochastic Modeling

The University of Toledo
College of Business and Innovation

Instructor:
Term:
Credit Hours:
Class Location:
Class Day/Time:

Office Hours:
Office Location:
Office Phone:
Email:

COURSE DESCRIPTION

This course covers basic principles and methods in applied probability and stochastic modeling. The topics covered in this course include advanced probably theory, stochastic processes, Markov chains, Markov Decision Processes, queuing theory, computer simulation, etc. Applications of these techniques in supply chain management, manufacturing, transportation, and finance are introduced.

STUDENT LEARNING OUTCOMES

1. Learn advanced probably theory and stochastic processes;
2. Learn Markov chains and Markov Decision Processes;
3. Learn queuing theory and computer simulation;
4. Apply the methods in supply chain management, manufacturing, transportation, and finance.

REQUIRED TEXTS AND ANCILLARY MATERIALS

Dynamic Programming and Optimal Control, by Dimitri P. Bertsekas, 4th Edition.

Markov Decision Processes: Discrete Stochastic Dynamic Programming, by Martin Puterman, March, 2005.

Simulation with Arena, by David Kelton, Randall Sadowski, and Nancy Zupick, 5th Edition.

Selected academic journal articles.

UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the basis of Disability (ADA). The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

ACADEMIC ACCOMMODATIONS

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.

GRADING

Class presentation and discussion:	40%
Final exam:	30%
Project/Presentation/Paper:	30%

Grading Scale: You may earn grades based on the following scale:

A	≥ 93	B -	83 - 80	D +	69 – 67
A -	92 - 90	C +	79 - 77	D	66 – 63
B +	89 - 87	C	76 - 73	D -	62 – 60
B	86 - 84	C -	72 - 70	F	< 60

Class Presentation and Discussion

There will be a reading list available to you, which lists three to five academic journal articles for each topic listed below. Prior to the class each week, you are expected to read all of them and choose one to make a presentation to the class. You are also expected to give comments/questions to other presentations and discuss potential research ideas.

Final Exam

A final exam is required, which will be covering all the topics. The final exam will be scheduled in the final exam week. The specific time and location will be determined and announced. The final exam will be **open book/notes**.

Project/Presentation/Paper

For the final project, you are expected to conduct a project individually, applying some analytical methods and techniques studied in the course to a relatively real problem. You are expected to meet the instructor to discuss the project scope before and during the process. You will give a presentation and submit a project paper.

COURSE OUTLINE

Week	Topic
1	Introduction to Stochastic Modeling
2	Advanced Probably Theory
3	Theory in Stochastic Processes
4	Advanced Theory in Stochastic Processes
5	Theory in Markov Chain
6	Applications of Markov Chain in Operations and Supply Chain Management
7	Theory in Markov Decision Process
8	Solution Methods for Markov Decision Process
9	Applications of Markov Decision Process in Operations and Supply Chain Management
10	Queuing Theory
11	Advanced Queuing Theory
12	Computer Simulation
13	Advanced Computer Simulation
14	Applications of Computer Simulation in Operations and Supply Chain Management
15	Final project presentations
16	Final exam